IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Peter W. Laird and Cindy A. Eads

Filing Date: April 2, 2001

Appl. No.: 09/825,566

For: EPIGENETIC SEQUENCES FOR ESOPHAGEAL ADENOCARCINOMA

Art Unit: 1634

Examiner: Jehan S. Sitton

Docket: 47675-18

Date: February 10, 2006

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF DR. PETER LAIRD UNDER 37 C.F.R. § 1.132
(IN SUPPORT OF RESPONSE UNDER 37 C.F.R. § 1.116)

Sir:

I, Dr. Peter William Laird, hereby declare:

1. I am an internationally recognized scientist and am presently employed as an Associate Professor, Department of Surgery, University of Southern California, Keck School of Medicine, Los Angeles, CA, and as an Associate Professor, Department of Biochemistry and Molecular Biology, University of Southern California, Keck School of Medicine, Los Angeles, CA. I received a B.S. degree in 1982 and an M.S. degree, *Cum Laude* in 1984, both from the University of Leiden, The Netherlands, and additionally received a Ph.D. degree from the University of Amsterdam, The Netherlands, in 1988.

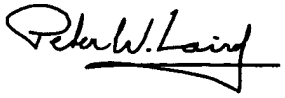
2. I am an author or co-author of more than 64 peer-reviewed research articles and have been invited to present my research at numerous occasions (50) over that past 20 years, including at national and international meetings. My curriculum vitae is attached hereto as APPENDIX A.

3. In my capacity as a research professor and scientist, I am an expert on molecular biology, nucleic acid-based technologies and sequences and particularly on DNA methylation. Additionally, I am generally familiar with epigenetic sequences relating to esophageal adenocarcinoma. I am also familiar with bioinformatics databases, including, for example GenBank.

4. I am an original named inventor on the present patent application (09/825,566, and understand that the specification of the application has been objected to based on alleged introduction of 'new matter.' Specifically, I understand that the Examiner has alleged that the introduction, by applicants' agent, of SEQ ID NO:66 (MYOD gene sequence, corresponding to GenBank accession number AF027148 as listed in applicants' original specification at Table II) represents new matter in the absence of a statement that the SEQ ID NO:66 is the same as the sequence of GenBank accession number AF027148 at the time the invention was made, prior to the filing of the instant application or of the underlying provisional application.

5. I hereby declare that the MYOD sequence presently submitted as SEQ ID NO:66 is the same as the MYOD sequence as it existed in GenBank at the time the invention was made, prior to the filing of the instant application or of the underlying provisional application. This conclusion is not only supported by my own records and analysis, but is also confirmed by the fact that the last update to the AF027148 sequence was on 07 AUG 1998 (see attached APPENDIX B, which is the current GenBank record for this sequence), and SEQ ID NO:66 is identical to that sequence.

6. I further declare that all statements made herein of my own knowledge are true and that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code.



Peter W. Laird

CURRICULUM VITAE

Current through February 9, 2006

Peter W. Laird, Ph.D.

PERSONAL INFORMATION

Name in Full	Peter William Laird, Ph.D.
Business Address	USC/Norris Comprehensive Cancer Center Room NOR 6418 1441 Eastlake Ave. Los Angeles, CA 90089-9176
Business Phone	(323) 865-0650
Business Fax	(323) 865-0158
E-Mail Address	plaird@usc.edu
Home Address	649 Forest Ave. South Pasadena, CA 91030
Home Phone	(626) 403-7068
Place of Birth	Groton, Mass., USA
Citizenship	USA
Spouse	Ite Laird-Offringa, Ph.D.
Children	Two Daughters

EDUCATION

1978-1982	University of Leiden, The Netherlands, B.Sc.,1982
1982-1984	University of Leiden, The Netherlands, M.Sc., 1984
1984-1988	University of Amsterdam, The Netherlands, Ph.D., 1988 with Dr. Piet Borst. Ph.D. Thesis: "Trans Splicing in *Trypanosoma brucei*"
1988-1991	Postdoctoral Fellowship with Dr. Anton Berns The Netherlands Cancer Institute, Amsterdam
1991-1996	Postdoctoral Fellowship with Dr. Rudolf Jaenisch The Whitehead Institute, MIT, Cambridge, MA

ACADEMIC APPOINTMENTS

1996-2002	Assistant Professor, Department of Surgery, University of Southern California, School of Medicine, Los Angeles, CA.

1996-2002	Assistant Professor, Department of Biochemistry and Molecular Biology, University of Southern California, School of Medicine, Los Angeles, CA.
2002-Present	Associate Professor, Department of Surgery, University of Southern California, Keck School of Medicine, Los Angeles, CA.
2002-Present	Associate Professor, Department of Biochemistry and Molecular Biology, University of Southern California, Keck School of Medicine, Los Angeles, CA.

ADMINISTRATIVE POSITIONS

1997-Present	Director of Basic Research, Department of Surgery
2004-Present	Co-Leader, Epigenetics and Regulation Program, Norris Comprehensive Cancer Center

HONORS AND AWARDS

1984	M.Sc. degree *Cum Laude* from the University of Leiden
1984-1988	ZWO (The Netherlands) Predoctoral Research Fellowship
1988-1991	NWO (The Netherlands) Postdoctoral Research Fellowship
1991-1993	National Research Service Award NIH/NCI Postdoctoral Fellowship
1996	Stop Cancer Lily Opas Research Career Development Award
1997	New Investigator Award, USC Liver Disease Research Center

ADMINISTRATIVE ACTIVITIES

University Committees

1996-1999	Radiation Safety Committee

School of Medicine Committees and Task Forces

1997-1998	Governance Document Task Force
1998	School of Medicine Dean's "Kitchen Cabinet Task Force"
1998-2002	School of Medicine Space Committee
2002-Present	Health Sciences Campus Interdepartmental Seminar Committee
2003-Present	Molecular Genetics and Cellular Biology Graduate Program Committee
2003	Member, Ad Hoc Committee for Promotion and Tenure
2003	Chair, Ad Hoc Committee for Promotion and Tenure

Departmental Committees

1997	Norris Cancer Center Vivarium Renovation Planning Committee
1997-1999	Health Sciences Campus Basic Science Seminar Committee
1997	Department of Surgery Web Page Development Committee

1997-Present	Director of Basic Research for the Department of Surgery
1998-Present	Surgical Council
1998	Norris Cancer Center Faculty Recruitment Search Committee
2000	Department of Preventive Medicine Molecular Epidemiology Faculty Recruitment Search Committee
2001	Norris Cancer Center Scientific Review Committee
2001-2002	Organization of Departmental Research Seminar Series for the Department of Surgery
2001-2003	Department of Biochemistry Ph.D. Admissions Committee
2003-Present	Department of Surgery Promotions and Appointments Committee
2003	Department of Biochemistry Qualifying Exam Committee
2003	Department of Biochemistry Faculty Merit Salary Increase Evaluation Committee

PROFESSIONAL ACTIVITIES

1987	Textbook Consultant and Reviewer, The Molecular Biology of the Gene, 4th Edition; by J.D. Watson, N.H. Hopkins, J.W. Roberts, J.A. Steitz, A.M. Weiner (1987); Benjamin/Cummings Publ. Co. Inc., Menlo Park, Ca., USA
1991-1992	Whitehead Institute for Biomedical Research program (monthly host) to inform high school teachers about current advances in science
1992	Organizing Committee, International Symposium "Molecular Genetic Approaches to Mouse Development" in honor of Dr. Rudolf Jaenisch's 50^{th} birthday
1992-1993	Organizing Committee, Postdoc Night, Whitehead Institute for Biomedical Research
1992-1994	Organizing Committee, weekly seminar series at the Whitehead Institute for Biomedical Research
1994	Science Advisor to the Third Annual Ruffin Convocation on "Genetics, Criminal Justice, and the Minority Community". September 23-24, 1994, Northeastern University - College of Criminal Justice
1995-Present	Board of Directors, DNA Methylation Society
1996-Present	Full Member, USC/Norris Comprehensive Cancer Center
1996-1997	Grant reviews for Southern California Environmental Health Sciences Center
1997	Co-founder, Orca Biosciences, Seattle, WA
1997-2000	Grant reviews for Cancer Research Campaign, London, U.K.
1997-2002	Study Section, Childrens Hospital Research Career Development Awards (RCDA), Los Angeles, CA
1999	Grant review, Alberta Cancer Board
2000-Present	Consultant, Epigenomics, A.G.
2001-Present	Scientific Advisory Board, Epigenomics, A.G.

2002-Present	American Cancer Society Internal Grant Review
2004	Co-Chair and Organizer, FASEB Meeting on Biological Methylation, July 10-15, 2004, Saxtons River, Vermont
2004	Steering Committee, Entertainment Industry Foundation, Breast Cancer Biomarker Project
2004-Present	Editorial Board, Cancer Biology & Therapy
2004-Present	Scientific Advisory Board, Canary Fund
2005	Wright Foundation Ad Hoc Grant Review
2005	Member of the 2005-2006 Selection Committee for the Kirk A. Landon-AACR Prize for Basic Cancer Research for the American Association of Cancer Research (AACR)
2006	NIH Study Section Epidemiology C (EPIC) Members Study Section

TEACHING ACTIVITIES

1996	Lecturer, Surgical Residency Core Curriculum.
1997	Lecturer and paper advisor, Special Topics: Frontiers in Basic and Applied Sciences, PATH 599, University of Southern California.
1997-2003	Department of Biochemistry Ph.D. Qualifying exam question design and grading.
1998-Present	Lecturer, exam question design and grading, Human Biology System, Medical School First Year Curriculum. (Currently: Core Curriculum, Cell Structure and Function).
1998-2004	Lecturer, exam question design and grading, and paper advisor, Molecular Genetics, INTD 561, University of Southern California.
1998-Present	Lecturer, exam question design and grading, Development and Cancer, BIOC 542, University of Southern California.
1998-2002	Lecturer, exam question design and grading, Human Molecular Genetics, BIOC 543, University of Southern California.
1998-2002	Lecturer, exam question design and grading, Molecular Biology of Cancer, INTD 504, University of Southern California.
1999-Present	Lecturer, Genetic Epidemiology, PM 533, University of Southern California.
2004-Present	Organizer Epigenetics Module, Lecturer, exam question design and grading, Molecular Biology of Cancer, INTD 504, University of Southern California.

TRAINEES

M.S.

1997-1999	Ruby Chan
1997-2001	René Malekian

2002-2004	Cindy Lin

Ph.D.

1996-2001	Matilda Chan
1997-2000	Cindy Eads
1998-2002	Binh Trinh
2000-2005	Nicole Sodir
2000-Present	Myungjin Kim
2001-Present	Sahar Houshdaran
2001-Present	Kwangho Lee
2003-Present	Toshinori Hinoue
2003-Present	Shirley Oghamian

Postdoctoral

1996-1998	Zhenggang Xiong
1999-2000	Saj Wajed
2000-2001	Karen Uhlmann
2003-2004	Gyeong Hoon Kang
2003-2004	Tasha Gandamihardja
2004-2005	Binh Trinh
2002-Present	Mihaela Campan
2003-Present	Daniel Weisenberger
2005-Present	Nicole Sodir

OVERVIEW OF RESEARCH ACTIVITY

Our goal is to contribute to a detailed understanding of the molecular basis of cancer, which in turn may lead to improved treatment strategies, earlier detection methods, and more accurate diagnoses. Our main focus is to understand the role of DNA methylation in cancer. DNA methylation occurs in mammals as a normal, enzymatic modification of cytosine bases and is associated with gene silencing. We take a multi-disciplinary approach to understanding how DNA methylation affects the cancer process. Research methods employ a combination of molecular biology, cell culture, genetically manipulated mice, as well as population-based epidemiologic approaches in humans, and collaborative clinical studies. Our research spans from studies of the most basic cellular mechanisms to divising new diagnostic methods for clinicians. We have close interactions with other molecular biologists, biochemists, epidemiologists, statisticians, pathologists, surgeons, and oncologists. In recent years we have demonstrated the complete genetic suppression of tumor formation by reduced DNA methylation in a mouse model of the human disease Familial Adenomatous Polyposis, and we have developed several novel DNA methylation analysis techniques, including COBRA and a patented high-throughput technique called "MethyLight".

INVITED LECTURES

10/24/1985 SFB 165 Symposium "RNA Synthesis and Processing", Würzburg, Germany. *Speaker:* "Discontinuous Synthesis of mRNAs in Trypanosomes"

08/26/1986 17th FEBS Meeting, Berlin, Germany. *Speaker:* "Discontinuous Synthesis of mRNAs in Trypanosomes".

12/17/1986 University of Geneva, Dept. of Molecular Biology, Geneva, Switzerland. *Invited Seminar:* "Discontinuous Synthesis of mRNAs in Trypanosomes".

12/18/1986 University of Bern, Institute of General Microbiology, Bern, Switzerland. *Invited Seminar:* "Transsplicing in *Trypanosoma brucei*".

05/23/1989 University of Edinburgh, U.K. *Invited Seminar:* "The Mouse Pim-1 Proto-Oncogene".

10/26/1990 Topics in Biotechnology, Symposium at International Institute of Cellular and Molecular Pathology, University of Brussels, Belgium. *Speaker:* "Transsplicing in *Trypanosoma brucei*".

09/01/1990 The 1990 Cold Spring Harbor Symposium on Mouse Molecular Genetics., Cold Spring Harbor, New York, NY. *Speaker:* "Gene Targeting of the Murine Pim-1 Proto-oncogene".

09/04/1994 The 1994 Cold Spring Harbor Symposium on Mouse Molecular Genetics., Cold Spring Harbor, New York. *Speaker:* "Mutagenicity of DNA Methyltransferase in Mammalian Cells".

02/14/1995 Netherlands Cancer Institute, Amsterdam, The Netherlands. *Invited Seminar:* "The Role of DNA Methylation in Cancer".

11/09/1996 153rd Meeting of The Society of Clinical Surgery, Los Angeles, CA. *Speaker:* "Gene Targeting in Cancer Research".

11/10/1996 American Association for the Study of Liver Disease, 47th Annual Meeting, Chicago, IL. *Speaker:* "The Use of Gene Targeting to Study the Role of DNA Methylation in Cancer".

12/12/1996 Childrens Hospital Los Angeles, Los Angeles, CA. *Invited Seminar:* "The Role of DNA Methylation in Cancer".

06/16/1997 FASEB Summer Research Conference on Biological Methylation. Saxtons River, Vermont. *Chair:* "DNA Methylation: Gene Expression & Cancer".

09/01/1997 Symposium: Barrett's Ablation Therapy, Chateau de la Bretesche, Brittany, France. *Speaker:* "Studies on the Trigger for Barrett's Metaplasia Using Knock-Out Mice and Rats".

09/05/1997 4th New England Biolabs Workshop on Biological DNA Modification. Innsbrück – Igls, Austria. *Speaker:* "Comparison of DNA Methylation Patterns of Matched Mismatch Repair Proficient and Deficient Human Colorectal Tumors using COBRA". *Chair:* "Genetic Imprinting and Epigenetics".

03/03/1998 Society of Toxicology, 37th Annual Meeting. Seattle, WA. *Speaker:* "Altered DNA Methylation, Epigenetics and Cancer".

08/10/1998 Gordon Research Conference on DNA Alterations in Transformed Cells. Colby-Sawyer College, NH. *Speaker:* "DNA Methylation as a Key Player in Genetic and Epigenetic Mechanisms of Cancer".

09/25/1998 Curie Workshop on Epigenetics and DNA Methylation. Paris, France. *Speaker:* "The Role of DNA Methylation in Colorectal Tumorigenesis".

03/30/1999 Arizona Cancer Center, Tucson, AZ. *Invited Seminar:* "The Role of DNA Methylation in Cancer".

05/18/1999 University of California Santa Barbara. Santa Barbara, CA. *Invited Seminar:* "The Role of DNA Methylation in Cancer".

07/19/1999 FASEB Summer Research Conference on Biological Methylation. Saxtons River, Vermont. *Speaker:* "High-Throughput Analysis of DNA Methylation and DNA Methyltransferase Expression in Human Tumors".

04/02/2000 91st Annual AACR Meeting. San Francisco, CA. *Chair:* "DNA Methylation I"

09/13/2000 National Cancer Institute Colorectal Family Registry Meeting. Toronto, CA. *Speaker:* "High-Throughput Studies of DNA Methylation with Paraffin-Embedded Tissue".

10/27/2000 Modeling Human Colo-Rectal Cancer in Mice. The Jackson Laboratory, Bar Harbor, ME. *Speaker:* "Complete Genetic Suppression of Gastro-Intestinal Tumorigenesis by *Dnmt1* Hypomorphic Alleles".

02/26/2001 Medical and Surgical Aspects of Esophageal and Foregut Disorders: Pathophysiology and Treatment. Mauna Kea Beach Hotel, Hawaii. *Speaker:* "Molecular Markers of Adenocarcinoma".

04/30/2001 Vanderbilt University Medical Center. Nashville, TN. *Invited Seminar:* "Clinical and Biological Implications of DNA Methylation Changes in Cancer".

07/21/2001 FASEB Summer Research Conference on Biological Methylation. Saxtons River, Vermont. *Speaker:* "High-Throughput Analysis of DNA Methylation and DNA Methyltransferase Expression in Human Tumors".

08/06/2001 Trans-HHS Workshop: Diet, DNA Methylation Processes and Health. Bethesda, MD. *Speaker and Session Chair:* "Current Methodologies in DNA Methylation Analysis".

09/19/2001 AACR Special Conference "Epigenetics of Cancer". Palm Desert, CA. *Speaker:* "Clinical and Biological Implications of DNA Methylation Changes in Cancer".

11/03/2001 Association of Pathology Chairs and Managers Western and Mid-Western Annual Conference. Puerto Vallarta, Mexico. *Speaker:* "Molecular Diagnostics Using Genomic DNA Methylation Patterns".

12/03/2001 NCI Workshop "Epigenetics in Early Cancer Detection and Risk Assessment". Bethesda, MD. *Speaker:* Technology Advancement in Epigenetics and Cancer.

05/29/2002 CNIO Cancer Conference on "DNA Methylation and Chromatin". Madrid, Spain. *Speaker:* "DNA Methylation and Mismatch Repair".

08/07/2002 FASEB Summer Research Conference on Folic Acid, Vitamin B12, and One-Carbon Metabolism. Saxtons River, Vermont. *Speaker:* "DNA Methylation: An Alternative Pathway to Cancer".

09/26/2002 European Surgical Institute Symposium "US Meets Europe on Barrett's". Norderstedt, Germany. *Speaker:* "Epigenetic Alterations and Progression to Adenocarcinoma".

01/31/2003 Seventh EDRN Steering Committee Meeting. Birmingham, Alabama. *Speaker and Panelist:* "Planning for Methylation Validation Studies Across Cancer Sites: Principle, Practice and Implementation".

08/17/2003 Gordon Research Conference on New Frontiers in Cancer Detection and Diagnosis, Andover, New Hampshire. *Speaker:* "DNA Methylation Profiles in Breast Cancer".

08/22/2003 Fred Hutchinson Cancer Research Center. Seattle, Washington. *Invited Seminar:* "DNA Methylation and Cancer".

09/11/2003 Southern California Environmental Health Sciences Center Annual Retreat. Los Angeles, California. *Speaker: "*Environmental Epigenomics".

02/28/2004 Canadian Digestive Disease Week. Banff, Canada. *Speaker: "*Epigenetic Alterations in Colorectal Cancer".

05/14/2004 Weissenburg Symposium on DNA Methylation - an Important Genetic Signal. Cologne, Germany, 2004. *Speaker: "*DNA Methylation and Cancer: Of Mice and Men".

05/19/2004 Epigenetics Think Tank, National Cancer Institute, Bethesda, Maryland. *Invited Panel Member.*

10/16/2004 Third Annual AACR International Conference "Frontiers in Cancer Prevention Research". Seattle, Washington. *Speaker: "*DNA Methylation, Carcinogenesis and Cancer Prevention".

11/12/2004 AACR Special Conference "Chromatin, Chromosomes and Cancer Epigenetics". Waikoloa, Hawaii. *Speaker: "*Exploring the Validity of the CpG Island Methylator Phenotype in Colorectal Cancer by MethyLight".

02/07/2005 Fred Hutchinson Cancer Research Center, Seattle, WA. *Invited Seminar: "CpG Island Methylator Phenotype in Colorectal Cancer – Resolving the Controversy".*

02/23/2005 NCI Science Writer's Workshop, Los Angeles, CA. *Speaker: "DNA-based early detection of cancer".*

04/05/2005 American Society of Pharmacology and Experimental Therapeutics (ASPET) Annual Meeting, San Diego, CA. *Speaker: "The Promise of DNA Methylation Markers in Cancer Prognostication".*

05/25/2005 Canary Fund Symposium *"Early Detection of Cancer: Realizing the Promise"*, Stanford University, Palo Alto, CA. *Speaker and Panel Chair: "DNA-Based Markers".*

06/15/2005 AACR Human Epigenome Workshop *"Toward a Human Epigenome Project"*, Landsdowne, VA. *Speaker: "Disease States".*

11/28/2005 NCI Workshop "Defining the Cancer Epigenome", Rockville, MD. *Speaker and Panel Chair: "Epigenome Technology".*

11/30/2005 NCI Workshop "Translational Epigenetic Science in Cancer", Rockville, MD. Speaker: "Diagnosis"

PATENTS

• Issued U.S. Patent # 6,331,393
Process for High Throughput Assay To Measure DNA Methylation.
Inventors: Peter W. Laird, Cindy A. Eads and Kathleen D. Danenberg.
Date Filed: 14 May 1999.
Date of Issue: December 18, 2001

• U.S. Patent Application Serial Number 06/193,839.
Epigenetic Sequences for Esophageal Adenocarcinoma.
Inventors: Peter W. Laird and Cindy A. Eads.
Date Filed: April 2, 2000
Status: Decision Pending

• U.S. Patent Application.
A New Assay for the Detection and Quantitation of Hemimethylation. Inventors: Peter A. Jones, Gangning Liang, Yoshitaka Tomigahara and Peter W. Laird.
Date Filed: November 9, 2000.
Status: Decision Pending

• U.S. Patent Application.
Association of Breast Cancer DNA Methylation Profiles with Hormone Receptor Status and Response to Tamoxifen. Inventors: Martin Widschwendter, Kim Siegmund, Peter A. Jones and Peter W. Laird.
Date Filed: June 1, 2004.
Status: Decision Pending

PAST RESEARCH FUNDING

1991-1993	NIH / NCI 1F32CA009097-01. In Vivo Analysis of the Wilms' Tumor Suppressor Gene. Principal Investigator: Peter Laird. NRSA Postdoctoral Fellowship; Sponsor: Dr. Rudolf Jaenisch $ 84,600 direct costs.
1996-1997	NIH / NCI Cancer Center Core Grant Pilot, 2CA-14089-21. The Role of DNA Methylation in Gastrointestinal Cancer. Principal Investigator: Peter Laird. $ 20,000 direct costs.
1997-1998	USC Liver Disease Research Center Pilot Grant. DNA Methylation and Chromosomal Stability in Intestinal Neoplasia. Principal Investigator: Peter Laird. $ 16,483 direct costs.
1998	NIH PAR-95-082. Improvement of Animal Resources at the Norris Cancer Center. Co-investigator. Principal Investigator: Dr. Rob Maxson. $ 618,096 direct costs for Norris (no Laird lab component).
1996-1999	Stop Cancer Career Development Award. $ 300,000 direct costs from Stop Cancer and Norris Cancer Center.
1997-1999	NIH / NCI / SEER N01 PC067010. Hormone Replacement Therapy and Colon Cancer. Co-Investigator. Principal Investigator: Dr. Ron Ross. $ 164,482 direct costs for Laird lab component.

1998-2001	ACS RPG-98-214-01-CCE. The Role of DNA Methylation in Esophageal Adenocarcinoma. Co-investigator. Principal Investigator: Dr. Kristin Skinner. $ 11,472 direct costs for Laird lab component.
1997-2002	NIH / NCI, 1 R01 CA75090-01. Suppression of Intestinal Neoplasia by DNA Hypomethylation. Principal Investigator: Peter Laird $ 688,067 direct costs.
2001-2002	The Wright Foundation. Pilot Cancer Epigenome Project. Principal Investigator: Peter Laird $ 49,902 direct costs.
2002-2003	NIH / NCI Contractual Agreement, 263-MQ-113043-1 DNA Methylation in Adenomatous Polyps. Principal Investigator: Peter Laird $ 56,000 direct costs.
2002-2003	Innovative Cancer Control Initiative Pilot Project Development of Novel Serum Markers for the Early Detection of Prostate Cancer Principal Investigator: Peter Laird $ 24,425 direct costs.
2003	Fidelity Foundation Epigenetic Regulation and Brain Disease Co-investigator. Principal Investigator: Dr. Rudolf Jaenisch $ 75,000 direct costs for Laird lab component.
2003	Contract with Epigenomics, A.G. DNA Methylation Analysis of Breast Cancer Principal Investigator: Peter Laird $ 53,750 direct costs.
1999-2004	NIH / NCI, 2 P01 CA17054-22 Iatrogenic Causes of Cancer. Co-investigator. Principal Investigator: Dr. Ron Ross. $183,944 direct costs for Laird lab component.
2000-2004	NIH / NCI, 1 R01 CA77376-01. DNA Methylation and Colorectal Polyps. Co-investigator. Principal Investigator: Dr. Robert Haile. $ 1,088,482 direct costs for Laird lab component.

2000-2004 NIH / NCI, 1 R01 CA84339-01.
Detection of Occult Metastases in Lung Cancer Patients.
Co-investigator. Principal Investigator: Dr. Richard Cote.
$ 40,796 direct costs for Laird lab component.

2002-2005 NIH / NIEHS 1 R21 ES11672-01
Environmental Epigenomics
Principal Investigator: Peter Laird
$ 450,000 direct costs.

2003-2005 NIH / NCI 1 R21 CA102247-01
Lung Cancer Diagnosis Using DNA Methylation Signatures
Co-investigator. Principal Investigator: Dr. Ite Laird-Offringa.
$ 65,000 direct costs for Laird lab component.

ACTIVE RESEARCH FUNDING

2002-2006 NIH / NCI 1 RO1 CA097346-01
Statistical Models in Epigenomics
Co-investigator. Principal Investigator: Dr. Kimberly Siegmund
$ 27,625 direct costs for Laird lab component.

2002-2007 NIH / NCI U01 CA074799
Colorectal Cancer Family Registry
Co-investigator. Principal Investigator: Dr. Robert Haile
$ 321,236 direct costs for Laird lab component.

2002-2007 NIH / NCI 1 R01 CA096958-01
DNA Methylation Markers in Ovarian Cancer
Principal Investigator: Peter Laird
$ 1,001,250 direct costs.

2002-2007 NIH / NCI, 1 R01 CA001815-01.
DNA Methylation Markers in Esophageal Adenocarcinoma.
Principal Investigator: Peter Laird
$ 1,125,000 direct costs.

2003-2007 NIH / NCI, 2 R01 CA75090-5A1.
Suppression of Intestinal Neoplasia by DNA Hypomethylation.
Principal Investigator: Peter Laird
$ 1,125,000 direct costs.

2005-2010 NIH / NCI, 1 R01 CA111187-1A1
HIV Associated DNA Hypermethylation in Cervical Cancer
Principal Investigator: Kiviat, (PI) (Subcontract from U of Washington)

$ 224,980 direct costs for Laird lab component.

PUBLICATIONS

1. **Laird, P.W.**, Kooter, J.M., Loosbroek, N. and Borst, P.
Mature mRNAs of *Trypanosoma brucei* Possess a 5' Cap Acquired by Discontinuous RNA Synthesis.
Nucleic Acids Research 13, 4253-4266, 1985.

2. **Laird, P.W.**, Zomerdijk, J.C.B.M., de Korte, D. and Borst, P.
In Vivo Labelling of Intermediates in the Discontinuous Synthesis of mRNAs in *Trypanosoma brucei.*
EMBO Journal 6, 1055-1062, 1987.

3. Gibson, W.C., White, T.C., **Laird, P.W.** and Borst, P.
Stable Introduction of Exogenous DNA into *Trypanosoma brucei.*
EMBO Journal 6, 2457-2461, 1987.

4. Imboden, M.A., **Laird, P.W.**, Affolter, M. and Seebeck, T.
Transcription of the Intergenic Regions of the Tubulin Gene Cluster of *Trypanosoma brucei:* Evidence for a Polycistronic Transcription Unit in a Eukaryote.
Nucleic Acids Research 15, 7357-7368, 1987.

5. **Laird, P.W.**, ten Asbroek, A.L.M.A. and Borst, P.
Controlled Turnover and 3' Trimming of the Trans Splicing Precursor of *Trypanosoma brucei.*
Nucleic Acids Research 15, 10087-10103, 1987.

6. **Laird, P.W.**
Trans Splicing in Trypanosomes - Archaism or Adaptation?
Trends in Genetics 5, 204-208, 1989.

7. **Laird, P. W.**, Zijderveld, A., Linders, K., Rudnicki, M.A., Jaenisch, R. and Berns, A.
Simplified Mammalian DNA Isolation Procedure.
Nucleic Acids Research 19, 4293, 1991.

8. van der Lugt, N.M.T., Robanus Maandag, E., te Riele, H., **Laird, P.W.** and Berns, A.
A pgk::hprt Fusion as a Selectable Marker for Targeting of Genes in Mouse Embryonic Stem Cells: Disruption of the T-cell Receptor ∂-Chain-Encoding Gene.
Gene 105, 263-267, 1991.

9. **Laird, P.W.**, van der Lugt, N.M.T., Clarke, A.R., Domen, J., Linders, K., McWhir, J., Berns, A. and Hooper, M.
In Vivo Analysis of *Pim-1* Deficiency.
Nucleic Acids Research 21, 4750-4755, 1993.

10. Domen, J., van der Lugt, N.M.T., **Laird, P.W.**, Saris, C.J.M., Clarke, A., Hooper, M. and Berns, A.
Impaired IL-3 Response in *Pim-1* Deficient Bone Marrow Derived Mast Cells.
Blood 82, 445-1452, 1993.

11. Domen, J., van der Lugt; N.M.T., Acton, D., **Laird, P.W.**, Linders, K. and Berns, A.
Pim-1 Levels Determine the Size of Early B Lymphoid Compartments in Bone Marrow.
Journal of Experimental Medicine 178, 1665-1673, 1993.

12 Domen, J., van der Lugt, N.M.T., **Laird, P.W.**, Saris, C.J.M., Berns, A.
Analysis of *Pim-1* Function in Mutant Mice.
Leukemia, *7(suppl 2)*, S108-S112, 1993.

13. **Laird, P.W.**, Jaenisch, R.
DNA Methylation and Cancer.
Human Molecular Genetics, 3, 1487-1495, 1994.

14. Berns, A., van der Lugt, N.M.T., Alkema, M., van Loohuizen, M., Domen, J., **Laird, P.W.**, Jonkers, J.
Mouse Model Systems to Study Multistep Tumorigenesis.
Cold Spring Harbor Symposia Quantitative Biology, 59, 435-447, 1994.

15. **Laird, P.W.**, Jackson-Grusby, L., Fazeli, A., Dickinson, S.L., Jung, W.E., Li, E., Weinberg, R.A. and Jaenisch, R.
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  TITLE     Methylation alterations of the MyoD1 upstream region are predictive
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  JOURNAL   Am. J. Pathol. 152 (4), 1071-1079 (1998)
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  AUTHORS   Chen,B.
  TITLE     Direct Submission
  JOURNAL   Submitted (26-SEP-1997) Pathology, University of Arkansas for
            Medical Sciences, 4301 West Markham St., Little Rock, AR 72205, USA
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